Implementing Campus Wind Systems

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PROJECT GOAL

To analyze the feasibility of wind as a sustainable source of energy at WPI and other colleges, and to generate a comprehensive implementation plan that can be applied to a variety of college campuses.

PROBLEM STATEMENT

WPI and other colleges strive to achieve sustainability, but few have implemented wind power on their campuses. Visible wind turbines are a prominent statement of a commitment to renewable energy. In addition, they help achieve sustainability goals and provide schools with valuable educational opportunities. However, schools cannot capitalize on these benefits without the proper implementation strategies for on-campus wind systems.

METHODOLOGY

1. Conduct a survey to determine community support and identify challenges that need to be addressed.
2. Identify the goals, requirements, and limitations for the wind system.
3. Identify a variety of small wind turbine designs and their key features.
4. Analyze gathered turbine data and select the most suitable models.
5. Develop a strategy by which colleges can plan their campus wind projects.
6. Apply this strategy to WPI.

GENERAL IMPLEMENTATION PROCESS

Identify Goals
Important goals include power output and monetary and educational benefits.

Site Analysis
Analyze wind speeds, building structures, and zoning laws of potential locations for turbines.

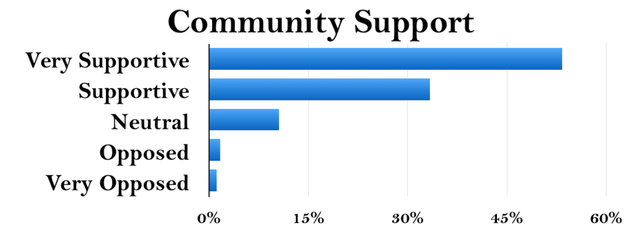
Size
The size of the system influences mounting options, aesthetics, and power output.

Cut-in Speed
The turbine's operating wind speed should align with the site's wind speeds.

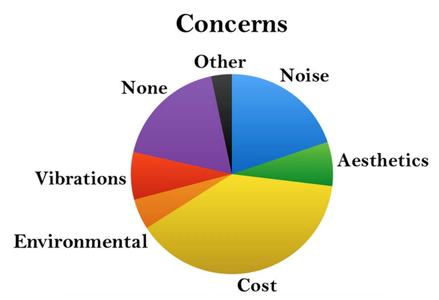
Budget
Consider the cost of analyses, installation, maintenance, and taxes, and search for grants.

Public Opinion
The turbine should have minimal impact on the community and be widely supported.

WPI PUBLIC OPINON SURVEY



180 WPI undergraduate students surveyed



RECOMMENDATION FOR WPI

The developed strategy was used to recommend a wind system specific to WPI. WPI is a small campus with average wind speeds of 3 m/s. WPI already owns a Swift Turbine; relocating it to the peaked roof of the Bartlett Center could improve its performance and reduce initial expenses. In addition, several higher-producing Windspire IVs could be placed on Daniels Hall to take advantage of the stronger wind speeds at that location. Further wind and structural analyses would be needed to make an optimal recommendation.

GENERAL DESIRABILITY

Wind Generator 48V

Swift

Windspire IV

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